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ABSTRACT

Research was performed to develop and evaluate Job Aids ("how to do it" guidance, tools, and procedures) used by laypersons when implementing the Instructional Systems Development Model (ISD), which is used for program development and includes analysis, design, development, implementation, and control phases. Baseline data were collected from personnel as they performed each of the five phases of the ISD functions without the assistance of Job Aids. Job Aids were then provided to individuals who were engaged in each of the 19 major ISD activities. Data were collected relating to problems alleviated by using the Job Aid, problems encountered in using the Job Aid, and user acceptance of the Job Aid. All of the individuals given the Job Aids thought they were good or excellent. The only negative comments were editorial in nature. A major shortcoming of the evaluation was the fact that the continuous nature of the ISD process was not accommodated. There is still the need to evaluate the utility and impact of the Job Aids when applied to the ISD process as a whole. It was recommended that Job Aids be used throughout the entire ISD process for a given course development effort. (Needs assessment inventories, review form, background information checklist, and job and follow-up interview forms are appended.) (BPB)

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Technical Report 527

DEVELOPMENT OF JOB AIDS FOR INSTRUCTIONAL SYSTEMS DEVELOPMENT

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FOREWORD

The Computer Based Instructional Systems Team of the US Army Research Institute for the Behavioral and Social Sciences (ARI) performs research and development in the area of educational technology that applies to military training. Of interest are methods for training individuals to develop and utilize instructional courseware in reasonable time, at an acceptable cost.

This Technical Report describes the development and formative evaluation of eighteen Job Aids designed to support users of the Instructional Systems Development Model (ISD, TRADOC Pamphlet 350-30). The ISD Model is a step-by-step procedure for the analysis, design, development, implementation, and control of military course materials. To accomplish this research, ARI's resources were augmented by contract DAHC19-78-C-0100 with the Human Resources Research Organization.

Personnel at the US Army Engineer School, Fort Belvoir, Virginia, provided guidance during the developmental phase of the project: Dr. Everett Rompf, Mr. Jack Ainsworth and Ms. Lois Passman. In addition, the following individuals at the US Army Signal Center and Fort Gordon gave valuable assistance during the needs assessment and evaluation phases: Dr. William Ketner, Mr. Earl Duncan, Mr. Richard Arnold, Mr. John Meyers, Ms. Doris Lakeman, Mr. Dan Danilovich, Ms. Yvonne Waldin and Mr. Richard Eberl. Ms. Jean Farrell and Mr. Michael Hillelsohn of HumRRO also contributed to this effort.

The entire research project is responsive to the requirements of Army Project 2Q263743A794, FY 80 Work Program.

JOSEPH ZEIDNER
Technical Director

PREFACE

This document reports on a research project in which 18 Job Aids were developed to permit implementation of all phases (analyze, design, develop, implement, and control) of the Instructional Systems Development (ISD) model.

The research effort was performed in HumRRO's Educational and Training Systems Division, Dr. Robert J. Seidel, Director. Mr. Russel E. Schulz was the Project Director.

This research was supported by the U.S. Army Research Institute for the Behavioral and Social Sciences under Contract No. DAHC19-78-C-0010, "Computer Interactive Author Aiding." The project was monitored technically by Dr. Melissa Berkowitz, Dr. Bruce Knerr, Dr. Harold F. O'Neil, Jr., and Dr. Leon Nawrocki of the U.S. Army Research Institute. Their support and assistance in this research effort is gratefully appreciated. The authors also wish to express gratitude to all personnel at the U.S. Army Engineer School, Fort Belvoir, Virginia and the U.S. Army Signal Center and Fort Gordon, Fort Gordon, Georgia who provided assistance in the research project. Special appreciation is extended to the following individuals who contributed to the success of the project:

U.S. Army Engineer School

Dr. Everett Rompf, Education Specialist, Individual Training Division
Mr. Jack Ainsworth, Education Specialist, Individual Training Division
Ms. Lois Passman, Education Specialist, Individual Training Division

U.S. Army Signal Center and Fort Gordon

Dr. William D. Ketner, Deputy Assistant Commandant for Educational Technology
Mr. Earl Duncan, Education Specialist, Educational Technology Division
Mr. Richard Arnold, Education Specialist, Educational Technology Division
Mr. John Meyers, Former Chief, CE Operations Branch, Training Analysis Division
Ms. Doris D. Lakeman, Chief, CE Operations Branch, Training Analysis Division
Mr. Dan Danilovich, Chief, CE Maintenance Branch, Design and Development Division
Ms. Yvonne S. Walden, Education Specialist, Design and Development Division
Mr. Richard Eberl, Training Specialist, Design and Development Division

The assistance provided by Ms. Jean Farrell, formerly of HumRRO, who co-authored many of the Job Aids is gratefully acknowledged as is the work of Mr. Michael Hillelsohn who authored the Job Aid for ISD V.3 Revise System. Finally, a special thanks to Mrs. Alice Thompson whose excellent work contributed to the design and overall appearance of the Job Aids.

DEVELOPMENT OF JOB AIDS FOR INSTRUCTIONAL SYSTEMS DEVELOPMENT

BRIEF

Requirement:

The purpose of the research was to develop and evaluate Job Aids ("how to do it" guidance) for the activities identified in the Instructional Systems Development Model (ISD, TRADOC Pamphlet 350-30). The usefulness of the ISD Model depends upon Job Aids which will enable training personnel to translate the ISD procedures into instructional products.

Procedure:

A series of Job Aids was designed and developed for each of the five phases of the ISD Model based on needs assessments conducted at the US Army Engineer School (USAES), Ft Belvoir, VA and the US Army Signal Center and Ft Gordon (USASC&FG), Ft Gordon, GA. Baseline data were collected from USAES and USASC&FG personnel as they performed their ISD functions without the assistance of the Job Aids. The Job Aids were then provided to individuals who were engaged in the activity covered by the Job Aid. Data were collected relating to problems alleviated by using the Job Aid, problems encountered in using the Job Aid, and user acceptance of the Job Aid.

Findings:

Comparisons were made with the baseline data to assess the value of the Job Aids as used in the ISD process. The findings strongly supported the usefulness of the Job Aids.

Utilization of Findings:

A summative evaluation of the Job Aids is planned to assess their value to training personnel in the preparation and delivery of a complete course of instruction.

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INTRODUCTION

The purpose of this section is to provide a brief description of research and development in this area, a discussion of the rationale for this research, and an overview of the project history.

A SYSTEMS APPROACH TO TRAINING

The systems approach defines a process which focuses on the job that is ultimately to be performed and upon the individual who is to learn to perform that job. The systems approach is just what the name implies: a systematic process for specifying the desired products of training and selecting what will be taught, how it will be taught, what the presentation mechanism will be, and evaluating the effects of each phase of the process. It focuses on student performance as a determinant of content. Its proper application can hardly fail to improve instruction where only incidental attention has been given to these functions. However, after more than two decades of research and development in this area, the full benefits of applying the systems approach to instruction have yet to be realized.

Early efforts to standardize a definitive technology in this area included those by HumRRO (Crawford, 1962; Finan, 1962; Vallance & Crawford, 1962) on behalf of the U.S. Army in the early 1960s and the development of the U.S. Continental Army Command Regulation 350-100-1, Systems Engineering of Training, (1968) and the U.S. Air Force Manual 50-2, Instructional Systems Development (1970).

These attempts have culminated in the Instructional Systems Development (ISD) Model (TRADOC Pam 350-30 1975). This model was prepared by the Center for Educational Technology at Florida State University under contract with the Interservice Committee for Instructional Systems and Development, involving the Navy, Air Force, Marine Corps, and the Army. The ISD contains standardized rationale, terminology, and basic concepts of instructional systems.

Difficulties arose in applying the ISD approach to military training. Much of the early research in attempting to overcome these problems involved attention to the technical difficulties. One of the primary difficulties of the ISD model and its manuals is that it emphasizes "what to do," not "how to do it." ISD manuals are intended to have general applicability. However, the same methodologies cannot be applied to the universe of training problems. "How to do it" may vary widely even though the specific processes or "what to do" may remain fairly constant across training problems. Initially, the "what to do" nature of the ISD manuals was not a severe problem inasmuch as early users of the manuals were "expert" training developers. However, later, the possibility of having laypersons use the ISD approach to achieve the successes of the experts was explored. The use of an ISD manual by military personnel with little or no experience in training program design may cost a fraction of the cost of hiring or contracting out to experts to do the development However, specific guidance, tools, and procedures are needed by such laypersons for ISD to be appropriately and cost-effectively implemented within the military training establishment.

THE NEED FOR JOB AIDS

In this report "how to do it" guidance/tools/procedures will be referred to as Job Aids. These are designed to help all members of an instructional staff charged with meeting the objectives of one or more components of the instructional systems development process.

Job Aids are needed in all Phases of the ISD process if significant improvements are to occur in applying this systematic approach toward producing instruction. This approach is expensive, time consuming, critical, and requires specialized capabilities.

A wide variety of aids do exist, but the majority are more of the "what to do" type than the "how to do it" variety. Rather than providing actual help in performing the work, or even providing detailed how-to-do-it guidance, most of the existing aids may serve to reinforce or broaden the guidance provided in the ISD manuals. Aagard and Braby (1976) note the practical limitations in using their algorithms and guidelines for general purposes, "The task categories and related guidelines are not at a level that will accommodate any training setting." Briggs' handbook (1970) may also serve such a broad guidance function.

Care should be exercised in the selection of aids to be integrated with ISD, however, so that authors are not confused by different yet similar models, sets of jargon, procedures of forms. Existing general manuals differ from one another in that they:

- Include different steps or different names for steps.
- Include different methods of accomplishing each step.
- Provide different levels of specificity in the details included under each step.
- Provide different formats for reporting the work accomplished under each step.

Thus, to provide the most efficient aids to authors, the guidance found in some of these manuals and guidebooks needs to be translated and integrated into the ISD framework, rather than referred to in its source form.

Recently, increasing emphasis has been placed on the development of "how to do it" aids. A course which guides trainees in specifying learning activities and in developing tests and instructional materials is reported by O'Neal and O'Neal (1970). Dyer, Matthews, Wright and Yudowitch (1976) prepared guidance for instructional technologists who are tasked to develop or administer questionnaires as part of Army field tests and evaluations. In an effort to assure the quality of instructional development, Ellis, Wulfeck, and Fredericks (1979) developed the Instructional Quality Inventory. Conoley and O'Neil (1979) presented a detailed and pragmatic set of guidelines for multiple-choice item generation and review.

In the project described in this document, Job Aids were developed to provide the specific guidance ("how to do it") needed for implementing the ISD model.

PROJECT HISTORY

On-line Job Aids developed in a previous ARI project (Schulz, Hibbits, Wagner & Seidel, 1979) demonstrated the utility of assisting authors to implement the ISD process. The major characteristics which accounted for the usefulness of the Job Aids are:

- The Aids are query-based and interactive.
- They are based upon a realistic authoring needs assessment at an operational site.
- The Job Aids were developed and evaluated according to ISD guidance and recommended procedures.
- Detailed authoring flowcharts accompanied on-line Job Aids.
- The Job Aids were designed to be system independent.
- The Job Aids concentrate on assisting users to deal with structural and administrative details permitting them to concentrate their efforts on the subject matter content of the materials.

The research project described in this report is an extension of the previous ARI project. In the present research, Job Aids were developed to assist Army instructional systems development personnel in the analysis, design, development, implementation and control of instructional materials.

The research began in November 1977. During the research period Job Aids were developed and formatively evaluated. The ISD model was used to define the general activities to be covered in the Job Aids. (Figure 1 shows the ISD model.) Each Job Aid consists of two volumes—Descriptive Authoring Flowcharts and a Job Aid Manual. The latter contains prescriptive descriptions of the activities to be performed, along with critical references. They were designed to be stand-alone, step-by-step procedural guides, equally useful to individuals at all experience levels of the Instructional Systems Development process. The Job Aids were based on an assessment of user needs at the U.S. Army Engineer School (USAES), Fort Belvoir, Virginia, and the U.S. Army Signal Center and Fort Gordon (USASC&FG), Fort Gordon, Georgia. They were implemented and evaluated at the USASC&FG.

Initially, 13 Job Aids were developed and evaluated, one for each block of the ISD model except for Block I.1, Analyze Job. A Job Aid was not developed for this block for the following reasons:

(1) The research plan called for the formative evaluation of the Job Aids at the USAES. Discussions with USAES personnel indicated that the majority of jobs at the USAES had undergone job analysis. Since personnel at USAES would not be performing this activity during the research period, one could not evaluate a Job Aid developed for this activity.

(2) Job analysis is a highly complex activity that requires input from many sources. Many of these sources are outside of the USAES. Therefore, it would have been difficult to obtain the input in a form needed for the research effort.

(3) Because of the complexity of performing job analysis, and the multiplicity of Job Aids needed for doing so, development of an adequate Job Aid for this block would require too much of the total research resources.

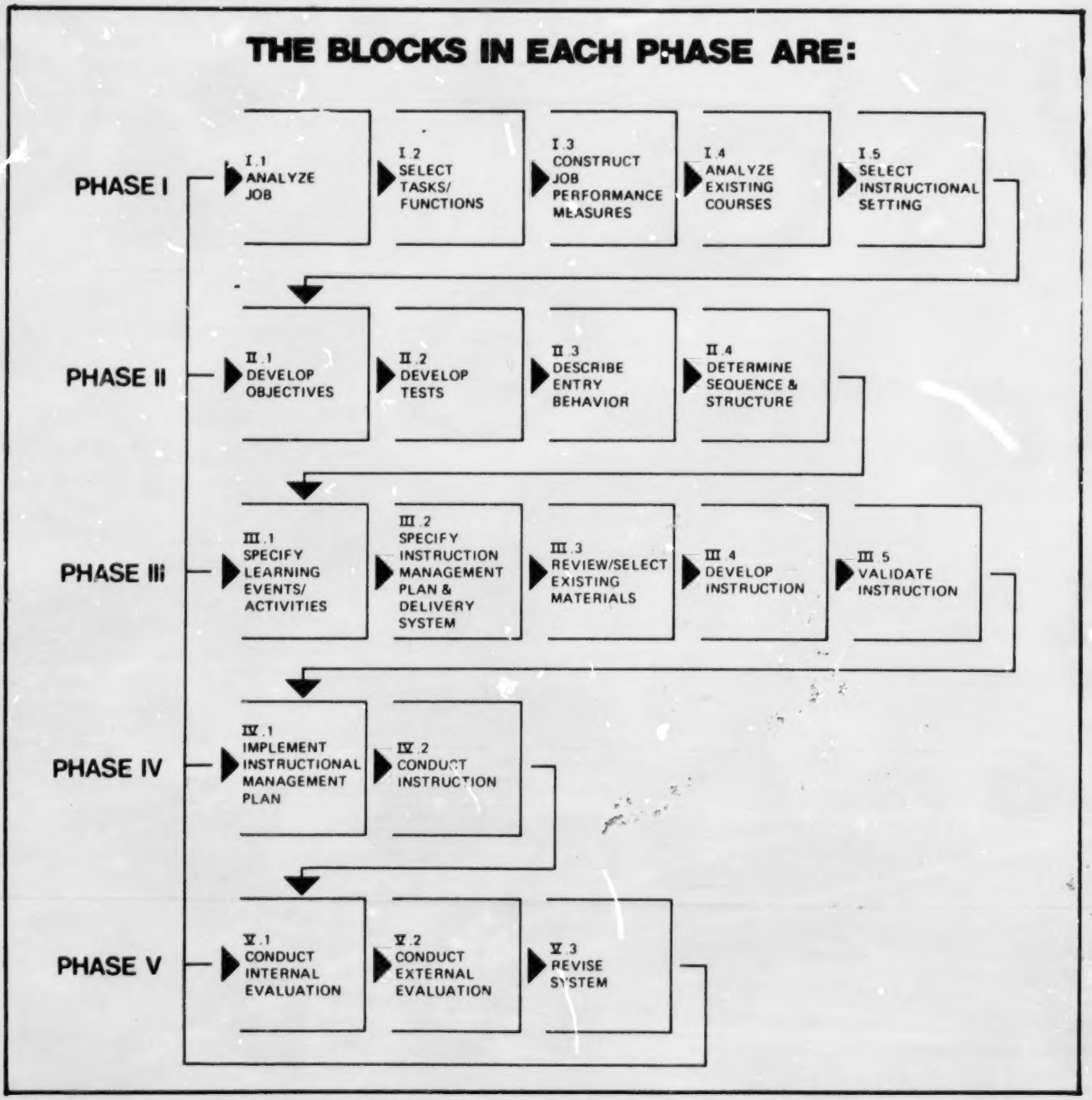


Figure 1. THE ISD BLOCKS IN EACH OF THE FIVE ISD PHASES

The evaluation plan for the initial 13 Job Aids was to have USAES instructional development personnel use the Job Aids in an actual job setting as they were performing the activities required by the ISD model. However, shortly after beginning work it was discovered that all Phase I ISD activities for courses at USAES had been completed. Previous information indicated that all ISD Phase I, II, and III activities were being continuously performed at USAES. Because no new courses were to be established during the research period it would not be possible to conduct a formative evaluation of the Job Aids for Blocks I.2 (Select Tasks/Functions), I.3 (Construct Job Performance Measures), I.4 (Analyze Existing Courses), and I.5 (Select Instructional Setting) at USAES. In order to accomplish the work, a revision in the research plan was made to change the location at which the aids were to be evaluated. The U.S. Army Signal Center and Fort Gordon (USASC&FG), Fort Gordon, Georgia was selected as a substitute for USAES for the following reasons:

(1) Activities in all phases of the ISD model were being actively worked on at USASC&FG.

(2) The availability of more complete data at USASC&FG would permit more reliable and useful Job Aids to result from the research effort.

(3) Due to the considerable number of personnel available at USASC&FG who were engaged in the ISD process, it would be feasible to collect the data required for the formative evaluation in a timely manner requiring a minimal delay in project activities.

Upon completion of the development and formative evaluation of the Job Aids for the first three phases of the ISD model another project effort was initiated. It involved the development and evaluation of a prototype system-independent Programming Design Guide for an interactive Job Aid. The research was performed to evaluate the feasibility of translating the Job Aids into a computer-based instruction format.

The Programming Design Guide provided all of the guidance necessary for a user to implement the Job Aid on any of a large number of computer systems. The specific Job Aid selected for the effort was the Job Aid for ISD Block I.5, Select Instructional Setting. This Job Aid was selected because it was representative of all of the Job Aids in the first three phases of the ISD model in terms of level of difficulty of translation into computer-based instruction format.

The Programming Design Guide format used led to a successful implementation of the Job Aid for selecting instructional settings. As this Job Aid is representative of the other Job Aids, it is expected that the approach used in the development of the Programming Design Guide will be equally successful for implementing other Job Aids on-line. The Programming Design Guide research is described in a report by Schulz, Underhill, Hargan, and Wagner (1980).

The successful use of the 13 Job Aids developed earlier in this project for ISD Phases I, II, and III, indicated that the interactive job aid approach would also meet the requirements for Phases IV and V of the ISD model. Therefore, five additional Job Aids covering the activities in Phases IV and V were developed. Implementation and evaluation of these Job Aids occurred at the USASC&FG.

The next section of this report provides a detailed description of the analyses selection, development, and formative evaluation of the 18 Job Aids developed during the research effort.

RESEARCH ACTIVITIES

In this section the research activities involved in the analysis, selection, development, and formative evaluation of the 18 Job Aids will be discussed. Where the research activities differed between the development of the first 13 Job Aids (Phases I, II, and III of the ISD model) and the last 5 Job Aids (Phases IV and V) the research activities will be described separately. (The first 13 Job Aids will hereafter be referred to as Phase I, II and III Job Aids. Similarly the 5 Job Aids for Phases IV and V will hereafter be referred to as Phase IV and V Job Aids.) The development of the Programming Design Guide for on-line implementation of the ISD I.5 Select Instructional Setting Job Aid will not be discussed. The reader is referred to the report devoted to this Guide (Schulz, Underhill, Hargan, and Wagner, 1980).

The research effort was divided into three major tasks:

- Task 1: Analysis and Selection of Job Aids
- Task 2: Development of Job Aids
- Task 3: Evaluation of Job Aids

The activities involved in each of the three tasks are discussed below.

TASK 1: ANALYSIS AND SELECTION OF JOB AIDS

Task 1 activities were conducted in four steps. These steps are (1) perform Job Aids needs assessment, (2) analyze existing job aids, (3) identify candidate Job Aids, and (4) refine, modify or complete development of job aids.

Step 1. Perform Job Aids Needs Assessment

As shown in Figure 1, the ISD Model consists of 19 major ISD activities (blocks). In the Model, each of these activities is expanded into sub-element activities. For example, ISD Block II.1 Develop Objectives has been expanded into the sub-element activities shown in Figure 2.

In Step 1 a detailed Job Aids needs assessment was performed to establish priorities among the sub-elements of each ISD block for which Job Aids were to be completed. These priorities were needed because time restraints imposed upon the research would not permit equal developmental emphasis on all sub-element activities.

The needs assessment for the Phase I, II and III Job Aids was performed by means of a detailed structured interview administered to 11 course developers and 10 training analysts at the USAES. A copy of the Needs Assessment Inventory used for the interviews is contained in Appendix A. The interview dealt with topics such as the following:

- ISD products produced by the individual.
- The ISD input received by the individual and problems associated with use of this input.

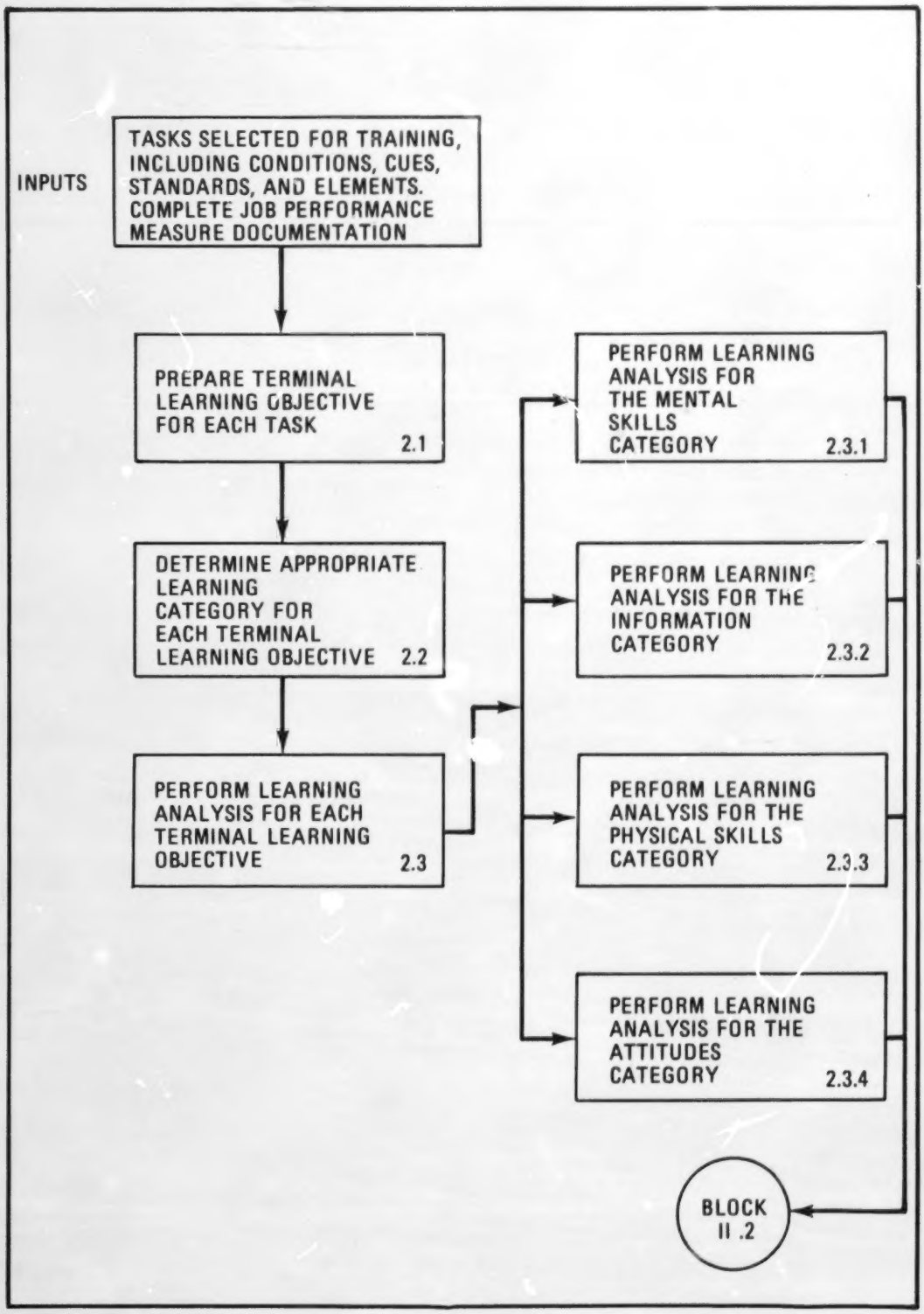

INPUTS
TASKS SELECTED FOR TRAINING, INCLUDING CONDITIONS, CUES, STANDARDS, AND ELEMENTS. COMPLETE JOB PERFORMANCE MEASURE DOCUMENTATION
PREPARE TERMINAL LEARNING OBJECTIVE FOR EACH TASK 2.1
DETERMINE APPROPRIATE LEARNING CATEGORY FOR EACH TERMINAL LEARNING OBJECTIVE 2.2
PERFORM LEARNING ANALYSIS FOR EACH TERMINAL LEARNING OBJECTIVE 2.3
PERFORM LEARNING ANALYSIS FOR THE MENTAL SKILLS CATEGORY 2.3.1
PERFORM LEARNING ANALYSIS FOR THE INFORMATION CATEGORY 2.3.2
PERFORM LEARNING ANALYSIS FOR THE PHYSICAL SKILLS CATEGORY 2.3.3
PERFORM LEARNING ANALYSIS FOR THE ATTITUDES CATEGORY 2.3.4
BLOCK II .2

Figure 2. FLOWCHART OF BLOCK II.1: DEVELOP OBJECTIVES

- The ISD output produced by the individual and problems associated with its production.
- ISD training available to the individual and additional training required.
- Availability of existing job aids and when available, the usefulness of the job aid.
- Ideas for needed additional Job Aids.

The results of the interviews indicated that there was a considerable need for Job Aids in all sub-elements of the blocks within the first three ISD phases. Specific needs were identified for each of the ISD blocks except for ISD Block II.3 (Describe Entry Bahavior) for which interviewees could not identify any specific sub-elements in need of assistance.

The major needs for Job Aids identified in the structured interviews were incorporated into a Needs Assessment Review Form which was then administered to 75 instructional development personnel at the USAES and 33 development personnel at the USASC&FG. For each need listed on the Review Form the respondents were asked to rate whether they "Strongly Agree," "Agree," "Disagree," "Strongly Disagree," or, "Cannot Judge." A copy of the Needs Assessment Review Form is contained in Appendix B.

Major findings from the Needs Assessment Review Form which shaped the content of the Job Aids are as follows:

(1) Specific guidance is needed for completing all ISD activities.

(2) Examples of the products are needed.

(3) Sources of information necessary for implementing the ISD Model (e.g., where to obtain "frequency of task performance" data) are needed.

The Needs Assessment conducted for the Phase IV and V Job Aids was conducted only at the USASC&FG with 27 instructional development personnel who were currently working in the ISD Blocks for Phase IV and V. The specific questions covered for each ISD Block are shown in Appendix C. The major results of this needs assessment are as follows:

- ISD IV.1 Implement Instructional Management Plan. Aids are needed which provide mathematical formulas for determining resources needed for implementation of the management plan. Guidance is needed for reviewing and revising the Instructional Management Plan.
- ISD IV.2 Conduct Instruction. The instruction that instructors receive currently for this ISD block is adequate and as a consequence, there is no need for a Job Aid for the actual conduct of instruction. It was agreed that a Job Aid for administration and analysis of student opinions concerning instruction would be helpful.
- ISD V.1 Conduct Internal Evaluation. The USASC&FG currently uses a checklist for conducting internal evaluation. Instructional guidance for answering the questions contained on the checklist was considered to be needed.
- ISD V.2 Conduct External Evaluation. Respondents expressed the need for general guidance in performing an external evaluation.
- ISD V.3 Revise System. No respondent was able to identify a clear need for a specific Job Aid for this ISD Block.

Step 2. Analyze Existing Job Aids

In Step 2 ISD literature was searched to identify existing job aids that would be useful for the research effort. Two major sources of job aid information was TRADOC Pamphlet 350-30, Interservice Procedures for Instructional Systems Development (1975) and the McDonnell Douglas Corporation Bibliography of Aids for Course Material Development (Logan, 1976). Each job aid identified was carefully analyzed to determine:

- Its relevancy.
- How it fits into the sub-element blocks.
- How it feeds information into other ISD blocks.
- The degree of similarity with other job aids.
- How it might be combined with other job aids to form a more comprehensive Job Aid.
- The amount of the total research effort that would be required to complete the job aid if it were selected for inclusion in the final listing of the Job Aids to be completed.

In general, no existing job aid was identified that could easily be translated into the interactive format proposed for the Job Aids to be developed in the research effort. However, the literature search did produce information that was cataloged for later use in Job Aid development. For example, much of the ISD materials produced at the USASC&FG later proved to be extremely valuable in the Job Aid development effort.

Step 3. Identify Candidate Job Aids

Based on the Job Aid needs assessment conducted in Step 1 and the analysis of existing aids performed in Step 2, candidate job aids were identified in Step 3.

Step 4. Refine, Modify, or Complete Development of Aids

It had been anticipated that existing aids would be identified that would be useful in the Job Aid research effort. It was thought that those aids would in most cases require only minor modification for presentation in an interactive format. This modification was to be accomplished in this Step. However, as already noted in the discussion of Step 2, no job aids were identified that could be easily modified for presentation in an interactive format. As a consequence, this step of the research was not performed. Rather, the information contained within some existing job aids was incorporated into the Job Aids developed in this project.

TASK 2: DEVELOPMENT OF JOB AIDS

Previous research (Schulz, 1975a, 1975b, Schulz, Hibbits, Wagner & Seidel 1979) indicated the utility of preparing Job Aids that make use of a flowchart format. While the Job Aids developed in this project were intended to be used initially off-line in a printed version, they were to be developed so as to facilitate possible later translation into on-line computer versions. Therefore, each Job Aid developed in this project is composed of two documents—Descriptive Authoring Flowcharts and Job Aid manuals. In addition, there is a document which provides an introduction to the use of the Job Aids and general information regarding useful resources for ISD implementation.

Job Aid Format

Introduction to the Use of Job Aids and Job Aids Resource Manual. The introduction describes the Job Aids, how they were developed, and provides general information on how to use the Job Aids. The Job Aids Resource Manual provides general information concerning CODAP (Comprehensive Occupational Data Analysis Programs), conducting field surveys, and the use of various panels of personnel in the ISD process. Figure 3 shows the major topics included in the Introduction to the Use of Job Aids and Job Aids Resource Manual.

Descriptive Authoring Flowcharts. The Descriptive Authoring Flowcharts are the primary documents used in the Job Aids. They direct the user to specific guidance, examples and references provided in the Job Aid Manuals. Figure 4 shows a representative page of descriptive authoring flowcharts. The flowcharts are easy to use in that they include only five flowchart symbols. The symbols are standard flowcharts symbols except for the one that looks like an open book or manual. This symbol is used to cue the user that he/she is to go to the Job Aid Manual for additional information or guidance. The directions contained within the flowchart symbols are frequently supplemented by narrative information provided in the margin of the Descriptive Authoring Flowcharts. This narrative information is sufficient to provide an overview of the activities that are to be performed in the Job Aid. The Descriptive Authoring Flowcharts are also sufficient to act as an executive summary for supervisors or commanders.

Job Aid Manuals. As stated above, the Job Aid Manuals provide the specific guidance, examples, and references necessary to help the user produce the products for the ISD activities covered by the Job Aid. In addition, each Job Aid Manual has associated with it one or more worksheets to use in the development of each product. When the user is referred to the Job Aid Manual an attempt has been made to provide four types of information: (1) the purpose for performing the activity called for in the flowchart block, (2) sources of information for performing the activity, (3) specific step-by-step guidance for performing the activity, and (4) if the activity involves filling in a worksheet, an example of what the worksheet looks like after the activity has been performed. In addition, the flowchart block for which guidance is given is reproduced at the top of the page of the Job Aid Manual. Figure 5 shows a representative page from a Job Aid Manual. (Note that flowchart block 9 is also represented in Figure 4.)

As previously stated, the Job Aids were intended to alleviate the needs expressed during the needs assessment survey. In some cases, guidance is readily available from other sources for meeting the needs; or in a few cases, time constraints placed on the research project would not permit the development of some needed guidance. As a consequence, the Job Aids do not always provide complete guidance or information for all activities in the ISD Block covered by the Job Aid. Therefore, a brief summary of the Job Aids for each ISD Block is provided below.

The Job Aids for the first three Phases of the ISD Model are available as Army Research Institute documents (Schulz & Farrell, 1980a, 1980b, 1980c, 1980d, 1980e, 1980f). Job Aids for the remaining phases are in press at this time (Schulz, Wagner & Hillelsohn). The Job Aids are grouped by ISD Phase. That is, there is a separate Descriptive Authoring Flowchart manual for the analysis, design, development, implementation, and control phase of the ISD model. Similarly, there is a Job Aid Manual for each of the phases.

INTRODUCTION TO THE USE OF JOB AIDS

What are Job Aids?
What is the Classification System Used in TRADOC Pamphlet 350-30 and Job Aids?
What Sources of Information Were Used in the Development of Job Aids?
What Job Aids are Presently Available and What Do They Consist of?
What are the Main Parts of the Flowchart Manual?
What Flowchart Symbols are Used in the Flowchart Manual?
What Instruction is Provided Within the Flowchart Symbols?
What is the Purpose of the Supplemental Information Provided in the Flowchart Manual?
What is the Flowchart Block and Page Numbering System?
How Do I Use the Job Aid Manual and What are the Main Parts of it?
What is the Purpose of the Partial Flowcharts at the Top of Some Pages of the Job Aid Manual?
What is the Purpose of the Questions Written in Script That Appear on Some Pages of the Job Aid Manual?
What is the Purpose of the Completed or Partially Completed Examples of Worksheets?
What Does This All Mean and What Do I Do Now?

JOB AIDS RESOURCE MANUAL

How Can the Resource Manual Help Me?
What Are Some Sources of Job Significant Data?
Which Sources of Data are Included in the Resource Manual?

Figure 3. MAJOR TOPICS INCLUDED IN THE INTRODUCTION TO THE USE OF JOB AIDS AND JOB AIDS RESOURCE MANUAL

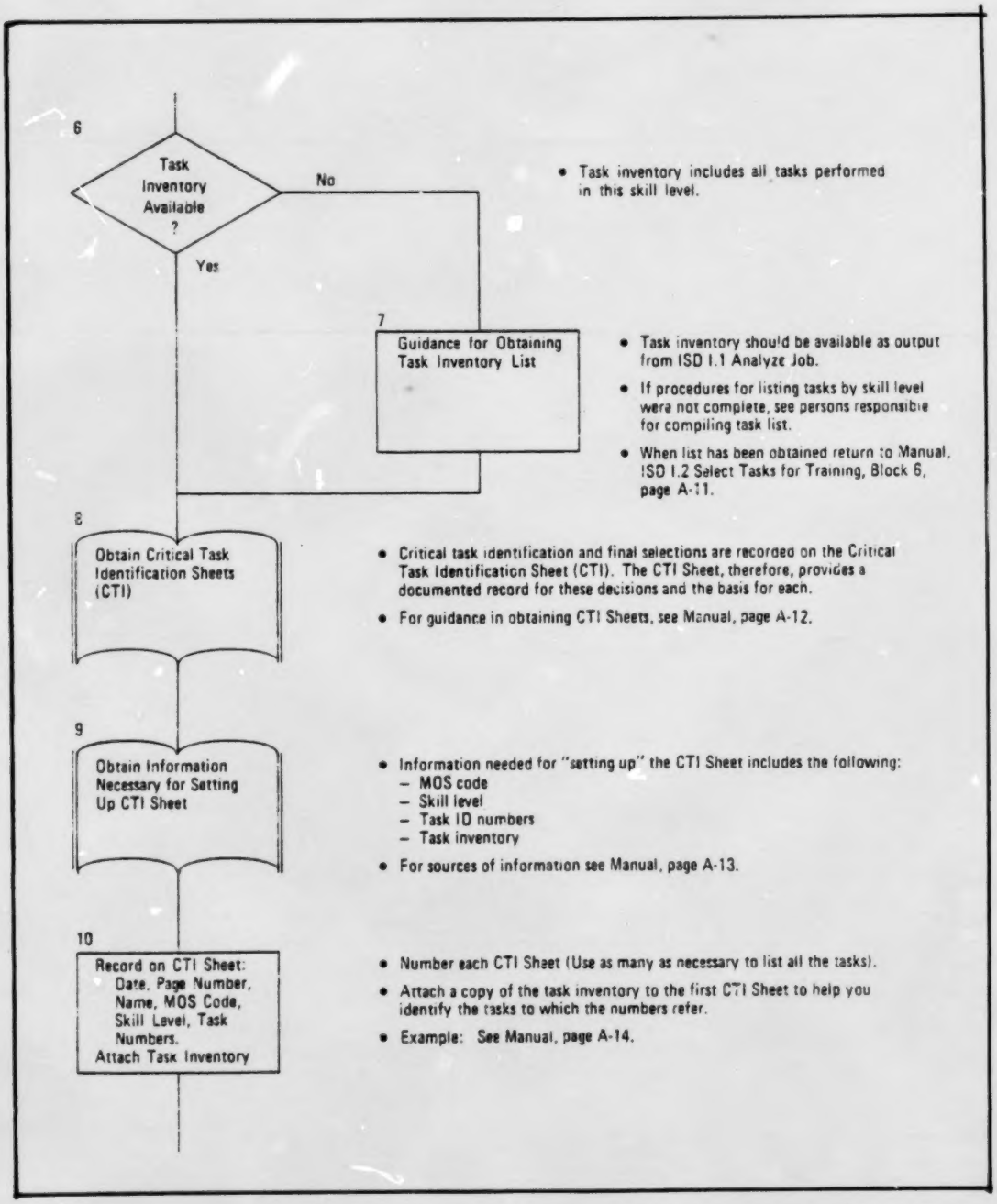
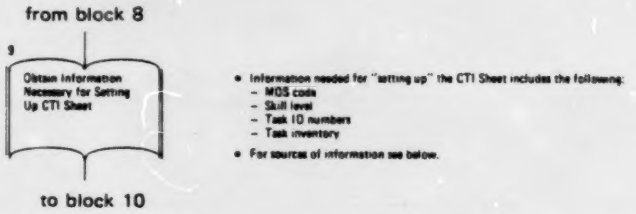

6
Task Inventory Available ?
No
Yes
• Task inventory includes all tasks performed in this skill level.
7
Guidance for Obtaining Task Inventory List
• Task inventory should be available as output from ISD I.1 Analyze Job.
• If procedures for listing tasks by skill level were not complete, see persons responsible for compiling task list.
• When list has been obtained return to Manual, ISD I.2 Select Tasks for Training, Block 6, page A-11.
8
Obtain Critical Task Identification Sheets (CTI)
• Critical task identification and final selections are recorded on the Critical Task Identification Sheet (CTI). The CTI Sheet, therefore, provides a documented record for these decisions and the basis for each.
• For guidance in obtaining CTI Sheets, see Manual, page A-12.
9
Obtain Information Necessary for Setting Up CTI Sheet
• Information needed for "setting up" the CTI Sheet includes the following:
– MOS code
– Skill level
– Task ID numbers
– Task inventory
• For sources of information see Manual, page A-13.
10
Record on CTI Sheet: Date, Page Number, Name, MOS Code, Skill Level, Task Numbers. Attach Task Inventory
• Number each CTI Sheet (Use as many as necessary to list all the tasks).
• Attach a copy of the task inventory to the first CTI Sheet to help you identify the tasks to which the numbers refer.
• Example: See Manual, page A-14.

Figure 4. REPRESENTATIVE PAGE FROM DESCRIPTIVE AUTHORING FLOWCHARTS


from block 8
9
Obtain Information Necessary for Setting Up CTI Sheet
to block 10
• Information needed for "setting up" the CTI Sheet includes the following:
– MOS code
– Skill level
– Task ID numbers
– Task inventory
• For sources of information see below.

What information do I need and where do I get it?

- The following information is needed before you can set up the CTI Sheet. Sources for locating each item of information are identified and in most cases throughout this manual the source will be rated as "excellent," "good," or "fair." Understandably not all sources of information will be readily available to you.

Information Required	Source(s)	Remarks
MOS and Skill Level designation	• Supervisor • AR 611-1 (for a new MOS) • Output of ISD I.1 Analyze Job	• Excellent source • Excellent source • Excellent source
Task I.D. Numbers	• Numbering system prescribed in TRADOC Circular 351-28, if already assigned	• Excellent source
	• Temporary numbering system of your own design, e.g. 1 through 500, if authorized numbers have not been assigned	• Excellent source
Task inventory	• Output of ISD I.1 or job analysis • List currently in use	• Excellent source • Good source

Figure 5. REPRESENTATIVE PAGE FROM JOB AID MANUAL

PHASE I - ANALYZE

ISD I.2 Select Tasks/Functions

The Job Aid for this block assists the user in making the decision of which tasks are to be selected for training and which are to be rejected. The output from using the Job Aid is:

- A final list of tasks for training.
- A list of tasks rejected.
- A summary of the data upon which the selection decision was based.

ISD I.3 Construct Job Performance Measures

This Job Aid provides guidance for performing a task analysis of each of the tasks selected for training. The output from use of the Job Aid is:

- Information concerning the conditions under which each task is performed.
- Cues indicating when it is performed.
- Standards indicating how well it should be performed.
- References and training tips.
- Identification of task elements or performance steps.

This information is recorded in a format which can be placed in the Soldier's Manual, understood by the soldier learning the task, and used as an evaluation tool by someone supervising the task.

ISD I.4 Analyze Existing Courses

The purpose of this Aid is to eliminate duplication of effort in several ISD processes. Thus, it contributes to one of the overall goals of ISD—to increase the cooperative development and use of training throughout the military services. Specific guidance is provided for analyzing existing courses. The output from this Job Aid can be:

- The generation of an initial task list for a particular MOS.
- The identification of suitable courses for training.
- The identification of courses, or parts of courses, which may be suitable after revision by course development personnel.

ISD I.5 Select Instructional Setting

The purpose of the Job Aid for this ISD Block is to provide guidance in choosing instructional settings (training locations) for tasks selected for training. Use of the Job Aid will result in a listing of all critical tasks in which each task is assigned for training to one of the following instructional settings:

- Institution (resident school training).
- Supervised on-the-job training (SOJT).
- Self-study.

PHASE II - DESIGN

ISD II.1 Develop Objectives

The purpose of the Job Aid for this ISD Block is twofold. First, it guides the user in the actual writing of correctly stated learning objectives. Second, it explains the mechanics of deriving learning objectives from Task Summary Sheets (developed in ISD I.3 Construct Job Performance Measures) by means of learning analysis. The outputs from use of this Aid are:

- Terminal learning objectives for each task to be trained.
- Learning objectives for task elements.

ISD II.2 Develop Tests

In this Job Aid the user is provided guidance in deciding whether tasks and task elements should be tested by means of written or performance type test items. Information and guidance is also provided for the preparation of written test items. The Job Aid does not cover the development of performance tests, nor does it cover preparation of administrative materials or validation of test items. The output consists of written test items which will be used to test the ability of soldiers to correctly perform critical tasks or task elements.

ISD II.3 Describe Entry Behavior

The goal of the Job Aid for this ISD Block is to provide the guidance necessary to test the entry behavior of trainees and to utilize this information to adjust the beginning point of instructional units; and to verify or revise the assumptions made in the learning analysis performed in ISD II.1, Develop Objectives, about entry skills and knowledges to be trained. The output from using this Job Aid is a validated learning analysis for each task.

ISD II.4 Determine Sequence and Structure

This Job Aid provides guidance for sequencing and grouping learning objectives to help assure that when instructional materials are developed, each learning objective is placed in the best relationship with other learning objectives to:

- Produce the most learning in the shortest period of time.
- Help the soldier make the transition from one skill or body of knowledge to another.
- Assure that supporting (enabling) knowledges and skills are acquired before subsequent subject matter is introduced.

Use of the Job Aid will result in the proper sequencing of all tasks and task elements.

PHASE III - DEVELOP

ISD III.1 Specify Learning Events/Activities

The purpose of the Job Aid for this ISD Block is to help the user to select appropriate learning events and activities for training sessions in which critical tasks will be taught. Learning research has identified learning activities and conditions which are essential for teaching different kinds of learning objectives. In this Job Aid, the user learns what those activities and conditions are. Use of this Job Aid will result in a listing of learning activities that could be used for teaching the learning objectives for each critical task.

ISD III.2 Specify Instructional Management Plan and Delivery System

The Job Aid for this ISD Block enables the user to apply a systematic approach to the selection of delivery systems (media) for presenting instruction to trainees. This systematic approach to media selection requires consideration of the nature of the objectives: their learning categories/subcategories, learning activities, and instructional settings. Such factors as equipment and facility constraints, cost of procurement, cost of replacement, and development costs are also considered in the Job Aid. However, the Job Aid does not provide guidance for conducting a cost-effectiveness analysis of media, nor for the actual development of the Instructional Management Plan. The output from this Job Aid is a complete identification of the characteristics of a delivery system to be employed for teaching each task and task element.

ISD III.3 Review/Select Existing Materials

In the Job Aid developed for this ISD Block guidance is provided to help instructional developers evaluate existing materials in order to determine their usefulness in the training program they are preparing. The Job Aid results in a list of all existing materials which have been considered for use in the course development activity. Each item of material is evaluated as to whether it should be accepted or rejected for use in the course. If the material is to be accepted, suggestions for revisions (if needed) are documented. Each item of material is therefore classified as:

- Accept for use without revision.
- Revise for use.
- Reject.

ISD III.4 Develop Instruction

The Job Aid for this ISD Block has two goals. The main goal of the Job Aid is to assist in producing training materials for the following media: audio-only, audio-visual, and written text. A secondary goal is to familiarize the user with the ways in which the various production personnel can help in the instructional development effort. The product resulting from use of the Job Aid is a first draft of instructional materials.

ISD III.5 Validate Instruction

Guidance for conducting two types of instructional validation is provided in the Job Aid for this block of the ISD model. They are: individual validation trials and group validation trials. Validation as used in this block of the ISD is the process by which instructional material (course, module, lesson, etc.) is tested and revised until it teaches what it was intended to teach. The Job Aid defines each of these types of trials and provides guidance in when and how to use them. The outcome from use of this Job Aid is a set of validated instructional units.

PHASE IV - IMPLEMENT

ISD IV.1 Implement Instructional Management Plan

The purpose of the Job Aid developed for this ISD Block is to provide guidance in the techniques to use for reviewing and revising (when necessary) the Instructional Management Plan developed in ISD III.2. The output from the use of this Job Aid is an accurate Instructional Management Plan suitable for implementation in ISD IV.2 Conduct Instruction.

ISD IV.2 - Conduct Instruction

This Job Aid emphasizes the collection of student performance and survey data during the conduct of instruction. It does not cover the actual conduct of instruction, inasmuch as this guidance is available from a number of other sources. Student Survey Forms and Instructor Survey Forms are provided which permit students/instructors to provide input as to needed changes in the instructional program. The Job Aid provides guidance as to when the survey forms should be administered and how to summarize data received from them. The output from this Job Aid will be student/instructor data useful for determining needed changes in the instructional program. Student/instructor data are addressed in the internal evaluation report prepared in ISD Block V.1.

PHASE V - CONTROL

ISD V.1 Conduct Internal Evaluation

The purpose of the Job Aid for this ISD Block is to provide the user with guidance in conducting an internal evaluation of courses which were developed using the Job Aids described above. The Job Aid assists the user to answer the following questions:

- "Is the instruction providing the students with the necessary knowledge and skills to meet the objectives in a satisfactory manner?"
- "To what extent did the development effort conform to the ISD process?"
- "How good are the products resulting from the various ISD activities?"

A detailed checklist and guidance for its use is provided for gathering the information needed to answer the above questions. The output from this Job Aid is an Internal Evaluation Report which is used to modify (where necessary) the products from previous ISD Blocks.

ISD V.2 Conduct External Evaluation

The purpose of the Job Aid for this ISD Block is to help the user to conduct external evaluations of training programs. Emphasis is given in the Job Aid to determine whether a school-taught course adequately trains its graduates. Graduate and Supervisor Survey Forms are provided in the Job Aid and instructions are given as to how these are to be administered and how the data derived from the survey are to be summarized. The output from use of this Job Aid will be an External Evaluation Report which will be used in the next ISD Block, V.3 Revise System, to determine revisions needed in the instructional program.

ISD V.3 Revise System

Guidance is provided in this Job Aid for making a careful analysis of data relating to doctrine changes, soldiers' performance on Skill Qualification Tests (SQT), and instructional program deficiencies reported in the Internal and External Evaluation Reports. Algorithms are provided for determining required course revisions based on the above information. The outcome from this Job Aid will be a report detailing the revisions needed in the instructional program.

The Job Aids described above were formatively evaluated at the USASC&FG. The formative evaluation was conducted in Task 3, Evaluation of Job Aids. A discussion of Task 3 follows.

TASK 3: EVALUATION OF JOB AIDS

Evaluation of Job Aids – Level 1 (Informal Review of Known Aids)

The first level evaluation in this project was carried out as part of the Job Aid development effort, and is described more fully in Task 1. Project staff reviewed published guidance and known ISD aids, attended workshops on the use of aids such as the Instructional Quality Inventory (IQI) (Ellis, et al., 1979), and visited a number of TRADOC installations to learn about any useful forms, instruments, or guidance that should be incorporated into the Job Aids.

Evaluation of Job Aids – Level 2 (Formative Evaluation of New Aids)

Previous information indicated that all ISD Phase I-III activities were being continuously performed at the USAES at Ft. Belvoir, Va. However, in early visits to USAES, it was discovered that it would not be possible to collect evaluation data for ISD Phase I Job Aids inasmuch as there was no one who would be working in this area during the proposed evaluation period. The USASC&FG at Ft. Gordon, Ga., was chosen as the alternative location, and evaluation plans were modified to accommodate the new site.

In Task 1, those ISD activities in most need of procedural guidance and assistance were identified. It was against these needs that the Job Aids were evaluated. The focus of this evaluation was whether or not the problems noted during the needs assessment were solved or ameliorated by the Job Aids.

A detailed formative evaluation plan was prepared which set up procedures for gathering evaluation data. The evaluation plan was described to USASC&FG personnel, and approval obtained prior to its implementation.

One of the features of the evaluation plan was the collection of baseline data. Its purpose was to determine how well school personnel were performing ISD Phase I-III activities without the assistance of the Job Aids to be provided in this project. A copy of the instrument used for the collection of baseline data is shown in Appendix D.

Following the collection of baseline data the Job Aids were provided to Ft. Gordon personnel to use in their ISD activities. USASC&FG personnel were given a very short training session in the purpose and use of the Job Aids. It was emphasized in the training session that the focus of the evaluation was the Job Aid itself, not the person who was working with it. Job Aid deficiencies were to be pointed out, but so too were those aspects of the Job Aid that were deemed to be helpful (e.g., more efficient procedures or specific guidance, etc.).

After each individual completed using the Job Aids he/she was interviewed concerning the practicality and usefulness of the Job Aids. The structured interview form used for these interviews is shown in Appendix E. In addition to interviewing Job Aid users, their immediate supervisors were also interviewed. In this latter interview the major emphasis was the supervisor's perceptions of any reduction or improvement in the efficiency of their subordinate's work from the use of the Job Aids. Finally, all personnel (Job Aid users and their immediate supervisors) were asked to identify specific changes, deletions, or additions that would increase the accuracy, timeliness, and usefulness of the Job Aids. Any serious problems that were identified were attended to as soon as possible and revisions made to the Job Aids.

In the evaluation of Phase IV and V Job Aids, "expert" review was the main approach used in assessing the Job Aids developed for these ISD Phases. Opinions regarding user acceptance were also obtained, as was information on problems that these personnel expected to experience while using the Job Aids.

Evaluation of Job Aids — Level 3 (Impact on Instruction)

The Job Aids were designed to facilitate many steps in the ISD process—and as such, ultimately should have an effect on instructional quality and relevancy. Those criteria are measured by a change in the behavior of students who undergo training in the course resulting from the ISD process. Although accumulation of student data could have indirectly served to assess the adequacy of the Job Aids, it was decided that this activity not be performed as part of the formative evaluation of the Job Aids. Rather, more attention was paid to the determination of Job Aids' usefulness and the need for improvements.

Findings

The formative evaluation plan proposed in this project produced much useful information for the revision and improvement of the Phase I-III Job Aids. The plan was followed for the Phase I-III Job Aids to the extent that:

- Baseline data were obtained from USASC&FG personnel regarding their ISD activities before Job Aids were introduced.
- Acceptance and use data were obtained following intervention with the Job Aids from some of the personnel from whom baseline data were collected.

The data obtained by the procedures outlined above were examined to determine the acceptance and utility of the Job Aids, and to see if any improvements needed to be made that would increase their efficiency and/or effectiveness. The effects of the Job Aids were most readily observed when the same USASC&FG personnel who participated in Task 1 (needs assessment) were the ones from whom the data were obtained regarding their use of the Job Aids. Data obtained from others highlighted the generality of the Job Aids' usefulness.

Background data were collected from personnel at U.S. Army Signal Center and Fort Gordon, Fort Gordon, Ga., who were engaged in activities covered by ISD Phases I-III. Background Information Forms and ISD Activity Checklists (see Appendix D) were administered to over 200 individuals. Approximately 50 of these individuals were visited one week later and interviewed by project staff concerning their ISD activities during the preceding two-week period. The specific individuals interviewed were selected on the basis of the ISD Activity Checklists completed the week before. In this way, a comprehensive set of information was gathered regarding the job activities of personnel working in the ISD process. The problems they encountered, the time to perform certain activities, and their opinions regarding the effectiveness and efficiency of the ISD process (prior to the intervention of Job Aids), were among the topics of most interest that were accumulated in the baseline data. Similar sets of data were obtained following their use of the Job Aids.

The results of this evaluation were unexpected. First, the intensity and extent of needs expressed by the USASC&FG and USAES personnel was much greater than had been anticipated. As was described in Task 1, Job Aids were perceived as needed in all blocks of ISD Phases I-III, and covered practically all activities within each block. These needs were supported by the baseline data collected in the ISD activity sheets. These data showed that the ISD activities took considerable time, due in part to the inaccurate and untimely information generated by inexperienced individuals. With this situation as the baseline condition, the reaction to the Job Aids was judged as positive.

All (100%) of the individuals given the Job Aids thought they were Good or Excellent. The only negative comments were editorial in nature. Problems with the flowchart format, as seen by its developers, were not confirmed by the users. Follow-up structured interviews (see Appendix E) with 57 of the users, elicited so much support for the draft Job Aids, that a change in project plans seemed essential. For example, there was the refusal by some of the users to part with the draft Job Aids on which their editorial comments were written, unless they could be replaced with other copies. Also, copies of the Job Aids were requested by other personnel in the school who were not participants in this study, but wanted to use them in their own ISD work. In addition, the Phase I and II Job Aids are being incorporated into a USASC&FG course that teaches the analysis and design of instructional development. This is only some of the evidence of acceptance that influenced the change in direction taken in the project.

Evaluation plans were curtailed and resources shifted to Job Aid development which permitted a broader set of activities to be covered by each Job Aid than had been proposed initially.

In the formative evaluation of Phase IV and V Job Aids the data emphasized editorial changes to the documents. While it is true that some of the same personnel who responded in the needs assessment, evaluated the Phase I-III Aids, this was not the case for the Phase IV and V Job Aids. Due to time and resource constraints, the ultimate users were not able to participate in the evaluation. Rather, only "expert" critiques of the draft Aids were obtained and the Job Aids modified accordingly. However, these Phase IV and V Job Aids will be sent to USASC&FG for review prior to their release by ARI for general use.

RECOMMENDATIONS

A major shortcoming of the evaluation was the fact that the continuous nature of the ISD process was not accommodated. That is, each Job Aid was prepared for use as a "stand-alone" set of documents that would assist those engaged in the activities covered by a given ISD block. It was assumed that the information feeding into that block—the information necessary for using a particular Job Aid—would be correct and available in a timely manner. This meant that the output or products of one Job Aid would have to be available for use by those who needed that product as input to their own Job Aid. Thus, when the evaluation of Phases I-III Job Aids was planned to occur simultaneously, an adequate evaluation of the impact or utility of the Job Aid was made extremely difficult and impractical within the constraints of this project's time and resources. As one result, the focus of the evaluation shifted from a comparison of pre- and post-use measures of the Job Aids, to a detailed critique and debugging of the Job Aids by actual and potential users. There is still the need to evaluate the utility and impact of the Job Aids when applied to the ISD process as a whole.

First, the Job Aids need to be consolidated. There are many examples of redundancy and duplication of forms and effort that should be eliminated.

Second, the Job Aids should be used throughout the entire ISD process for a given course development effort. In this way, a realistic, longitudinal evaluation of the Job Aids can be accomplished. The contribution of each Job Aid to the ISD process, and the eventual impact upon instructional quality and relevancy, could be assessed in this type of evaluation.

REFERENCES

Aagard, J. A., & Braby, R. *Learning guidelines and algorithms for types of learning objectives* (TAEG Rep. No. 23). Orlando, Fla.: Training Analysis and Evaluation Group, 1976.

Briggs, L. J. *Handbook of procedures for the design of instruction.* Pittsburgh, Pa.: American Institute of Research, 1970.

Conoley, J. C., & O'Neil, Jr., H. F. A primer for development test items. In H. F. O'Neil, Jr. (Ed.), *Procedures for instructional systems development.* New York: Academic Press, 1979.

Crawford, M. P. Concepts of training. In R. M. Gagne (Ed.), *Psychological principles in system development.* New York: Holt, Rinehart, & Winston, 1962.

Dyer, R. F., Matthews, J. J., Wright, C. E., & Yudowitch, K. L. *Questionnaire construction manual* (ARI Rep. No. P-77-1). Ft. Hood, Tex.: U.S. Army Research Institute for the Behavioral and Social Sciences, ARI Field Unit, July 1976.

Ellis, J. A., Wulfeck, W. H., & Fredericks, P. S. *The instructional quality inventory.* II. User's manual (NPRDC Special Rep. 79-24). San Diego: Navy Personnel Research and Development Center, August 1979.

Finan, J. L. The systems concept as a principle of methodological decision. In R. M. Gagne (Ed.) *Psychological principles in system development.* New York: Holt, Rinehart, & Winston, 1962.

Logan, R. S. *An exploratory computer-based model for comparing instructional alternatives and a bibliography of aids for course material development: A two part study* (Vol. II). St. Louis, Mo.: McDonnell Douglas Astronautics Company-East, September 1976.

O'Neal, A. F., & O'Neal, H. L. Author management systems. In H. F. O'Neil, Jr. (Ed.), *Issues in instructional systems development.* New York: Academic Press, 1979.

Schulz, R. E. *Lesson MONIFORMS: An authoring aid for the PLATO IV CAI system.* (HumRRO Research Product ED-75-6). Alexandria, Va.: Human Resources Research Organization, April 1975a.

Schulz, R. E. *MONIFORMS as authoring aids for the PLATO IV CAI system.* (HumRRO Tech. Rep. 75-5). Alexandria, Va.: Human Resources Research Organization, May 1975b.

Schulz, R. E. *Job aids: Descriptive authoring flowcharts for Phase IV—IMPLEMENT of the Instructional Systems Development model.* Alexandria, Va.: Army Research Institute, (in press).

Schulz, R. E. *Job aid manuals for Phase IV—IMPLEMENT of the Instructional Systems Development model.* Alexandria, Va.: Army Research Institute, (in press).

Schulz, R. E., & Farrell, J. R. *Job aids: Descriptive authoring flowcharts for Phase I—ANALYZE of the Instructional Systems Development model* (ARI Research Product 80-13). Alexandria, Va.: Army Research Institute, May 1980a.

Schulz, R. E., & Farrell, J. R. *Job aid manuals for Phase I—ANALYZE of the Instructional Systems Development model* (ARI Research Product 80-14). Alexandria, Va.: Army Research Institute, May 1980b.

Schulz, R. E., & Farrell, J. R. *Job aids: Descriptive authoring flowcharts for Phase II—DESIGN of the Instructional Systems Development model* (ARI Research Product 80-15). Alexandria, Va.: Army Research Institute, May 1980c.

Schulz, R. E., & Farrell, J. R. *Job aid manuals for Phase II—DESIGN of the Instructional Systems Development model* (ARI Research Product 80-16). Alexandria, Va.: Army Research Institute, May 1980d.

Schulz, R. E., & Farrell, J. R. *Job aids: Descriptive authoring flowcharts for Phase III—DEVELOP of the Instructional Systems Development model* (ARI Research Product 80-17). Alexandria, Va.: Army Research Institute, May 1980e.

Schulz, R. E., & Farrell, J. R. *Job aid manuals for Phase III—DEVELOP of the Instructional Systems Development model* (ARI Research Product 80-18). Alexandria, Va.: Army Research Institute, May 1980f.

Schulz, R. E., Hibbits, N., Wagner, H., & Seidel, R. J. *On-line authoring aids for instructional design* (ARI Technical Report 387). Alexandria, Va.: U.S. Army Research Institute, July 1979.

Schulz, R. E., Underhill, W. G., Hargan, C. S., & Wagner, H. *Computer interactive author aiding: Development of programming design guides* (HumRRO Final Rep. FR-ETSD-80-9). Alexandria, Va.: Human Resources Research Organization, June 1980.

Schulz, R. E., Wagner, H., & Hillelsohn, M. J. *Job aids: Descriptive authoring flowcharts for Phase V — CONTROL of the Instructional Systems Development model.* Alexandria, Va: Army Research Institute, (in print).

Schulz, R. E., Wagner, H., & Hillelsohn, M. J. *Job aid manuals for Phase V — CONTROL of the Instructional Systems Development model.* Alexandria, Va.: Army Research Institute, (in print).

U.S. Air Force. *Instructional Systems Development* (AF Manual 50-2). 1970.

U.S. Army. *Systems engineering of training* (CONARC Reg 350-100-1). Ft. Monroe, Va.: U.S. Army Continental Command, 1968.

U.S. Army. *Interservice procedures for instructional systems development* (TRADOC Pam 350-30). U.S. Army Training and Doctrine Command, 1975.

Vallance, T. R., & Crawford, M. P. Identifying training needs and translating them into research requirements. In R. Glaser (Ed.), *Training research and education.* Pittsburgh, Pa.: University of Pittsburgh Press, January 1962.

APPENDIX A

NEEDS ASSESSMENT INVENTORY FOR ISD PHASES I, II, AND III JOB AID DEVELOPMENT

I. IDENTIFICATION

1. Name: _____

2. Title: _____

3. Organization: _____

4. Are you a subject-matter expert in any military area(s)? If so, what area(s)?

5. Have you ever been an instructor at USAES? If so, what courses, positions, when, how long, etc.?

6. How long have you worked in ISD?

II. JOB

1. In which USAES courses do you work or have responsibility for someone else's work?

2. What are your responsibilities?

3. In what ISD activities are you presently working or supervising others? How long for each?

4. What additional ISD areas have you worked on (or supervised in) during the past year? How long for each?

What did you produce?

III. INTERFACE

1. From whom do you (or the individuals you supervise) receive input?

   a. What problems, if any, do you (or your staff) have in using the input?

   b. How much time per day/week/month do you (or your staff) spend on the related tasks because of the problem?

   c. What control do you have over the quality of the input?

   d. Do you have any suggestions as to how this input could be improved?

2. What are the Output products resulting from your (or the individuals you supervise) ISD activities?

a. To whom (or ISD block/activity) are the products delivered?

b. What feedback do you receive concerning the quality of the products?

c. (Supervisors only) How frequently do you send work back to your staff for revision? Explain.

d. (Non-supervisors) How frequently does your supervisor send your work back for revision? Explain.

IV. TRAINING AND JOB AIDS

1. What training have you had (military or civilian) on subjects related to instructional systems development, educational technology, and the like?

2. What additional training, if any, would you like to receive?

3. What job aids are available to you or your staff for performing ISD activities?

   a. Which of these do you actually use?

   b. How useful are the job aids?

   c. How could they be improved?

4. What locally produced forms do you (or your staff) complete relevant to ISD activities?

5. Which, if any, of these forms do you/your staff use? (Show interviewee appropriate forms shown in ISD manual.)

6. What happens to the completed form? (How is it used, by whom, etc.?)

V. OTHER PROBLEMS

1. What other problems do you encounter in your work that have not been mentioned earlier?

2. Do you have ideas about possible improvements in the ISD process that would help solve this problem(s)?

VI. IDEAS FOR ADDITIONAL AIDS

1. If you had the choice of selecting <u>five</u> ISD aids for development, what ISD areas would they cover?

2. Do you know someone who can provide additional ideas on the subjects we have discussed?

APPENDIX B

NEEDS ASSESSMENT REVIEW FORM FOR PHASES I, II, AND III JOB AID DEVELOPMENT

NAME: _____

TITLE: _____ Telephone Number: _____

ORGANIZATION (Division, Branch, etc.): _____

_____

How long have you worked in ISD? _____

* * * * * * * * * * *

Job Aids are being prepared for individuals who are performing the activities called for in TRADOC Pamphlet 350-30 (Interservice Procedures for Instructional Systems Development), Phases I, II, and III. These aids will be given to USAES personnel to try out and evaluate in the months ahead.

In January and February 1978 some USAES individuals from ITADD and CDD were surveyed as to the kinds of help they need in their work. The statements presented on the following pages represent the outcome of this survey.

We would like for you to read each statement and check whether you Agree or Disagree with it. The scale presented has four points so that you can indicate the level of your agreement or disagreement. If you cannot judge a particular statement because you have not worked in that phase of ISD, check the box labeled "Cannot Judge." Please check the "Cannot Judge" box only when absolutely necessary. A page has also been provided for you to add other assistance you need in your work.

Thank you for your cooperation. Your response to the statements, and the added comments, will provide greater assurance that the aids that we develop will indeed provide the needed assistance to you in your job.

GENERAL	Strongly Agree	Agree	Disagree	Strongly Disagree	Cannot Judge
1. We need complete approved examples of the products we are to produce.	☐	☐	☐	☐	☐
2. We need help in finding sources of information.	☐	☐	☐	☐	☐
3. We need a general orientation to the course development process.	☐	☐	☐	☐	☐
ISD BLOCK I.2: SELECT TASKS/FUNCTIONS					
4. We need help in identifying and defining standards for tasks.	☐	☐	☐	☐	☐
5. More information is needed on conditions of task performance.	☐	☐	☐	☐	☐
6. We need assistance in selecting critical tasks at the appropriate skill levels.	☐	☐	☐	☐	☐
7. Examples of good task statements are needed.	☐	☐	☐	☐	☐
8. Clearly spelled out procedures are needed for identifying and describing critical tasks and associated performance standards.	☐	☐	☐	☐	☐
ISD BLOCK I.3: CONSTRUCT JOB PERFORMANCE MEASURES					
9. More accurate information is needed regarding the sequence of steps in task performance.	☐	☐	☐	☐	☐
10. Realistic information is needed regarding actual job performance, available equipment, and references.	☐	☐	☐	☐	☐
11. More complete and detailed information is needed regarding task performance requirements to include enabling skills/knowledges.	☐	☐	☐	☐	☐

	Strongly Agree	Agree	Disagree	Strongly Disagree	Cannot Judge
ISD BLOCK I.4: ANALYZE EXISTING COURSES					
12. Documentation is needed on previous training analyses and decisions.	☐	☐	☐	☐	☐
ISD BLOCK I.5: SELECT INSTRUCTIONAL SETTING					
13. More guidance is needed on how to select from all possible training environments.	☐	☐	☐	☐	☐
14. We need more guidance on the purpose, content and format of Soldier's Manuals.	☐	☐	☐	☐	☐
ISD BLOCK II.1: DEVELOP OBJECTIVES					
15. More guidance is needed on how to prepare learning objectives.	☐	☐	☐	☐	☐
16. We need guidance on how to identify and analyze a task's skill and knowledge components.	☐	☐	☐	☐	☐
17. Examples of appropriately identified skills and knowledges are needed.	☐	☐	☐	☐	☐
ISD BLOCK II.2: DEVELOP TESTS					
18. We need a standard format for preparing SQT's.	☐	☐	☐	☐	☐
19. We need a redesigned "Brown Book" containing examples of SQTs.	☐	☐	☐	☐	☐
20. There is a need for aids in preparing course criterion tests.	☐	☐	☐	☐	☐
21. We need guidance on how to develop self-evaluation checklists and scoresheets.	☐	☐	☐	☐	☐
22. Guidance on how to write good test questions is needed.	☐	☐	☐	☐	☐
23. Guidance is needed on how to determine the difficulty of test questions.	☐	☐	☐	☐	☐

ISD BLOCK II.3: DESCRIBE ENTRY BEHAVIOR	Strongly Agree	Agree	Disagree	Strongly Disagree	Cannot Judge
No Aids were recommended					
ISD BLOCK II.4: DETERMINE SEQUENCE AND STRUCTURE					
24. Examples of course maps are needed.	☐	☐	☐	☐	☐
25. Examples of prescriptive outlines are needed.	☐	☐	☐	☐	☐
ISD BLOCK III.1: SPECIFY LEARNING EVENTS/ACTIVITIES					
26. We need help to identify the critical instructional materials.	☐	☐	☐	☐	☐
ISD BLOCK III.2: SPECIFY INSTRUCTIONAL MANAGEMENT PLAN AND DELIVERY SYSTEM					
27. We need guidance on how to select media appropriate to specific objectives.	☐	☐	☐	☐	☐
28. Guidance is needed on how to develop an instructional management plan.	☐	☐	☐	☐	☐
ISD BLOCK III.3: REVIEW/SELECT EXISTING MATERIALS					
29. We need guidance on how to locate, select, and review existing materials.	☐	☐	☐	☐	☐
ISD BLOCK III.4: DEVELOP INSTRUCTION					
30. Guidance is needed on the selection, use, and evaluation of visuals.	☐	☐	☐	☐	☐
31. Aids are needed for storyboarding sound-slide lessons.	☐	☐	☐	☐	☐
32. Guidance is needed on how to write effectively.	☐	☐	☐	☐	☐
33. Aids are needed for obtaining and using student data to identify weaknesses in training materials.	☐	☐	☐	☐	☐
ISD BLOCK III.5: VALIDATE INSTRUCTION					
No Aids were recommended.					

Please indicate in the space below other assistance you need in your work. Also, please identify, if possible, the ISD Block to which this aid will be appropriate.

ASSISTANCE NEEDED	ISD BLOCK

APPENDIX C

NEEDS ASSESSMENT INVENTORY FOR ISD PHASES IV AND V JOB AID DEVELOPMENT

IV.1 IMPLEMENT INSTRUCTIONAL MANAGEMENT PLAN

Sample: Chief (or his Representative) of Each Academic Department

QUESTIONS

1. Name

2. Academic department

3. Courses taught in department—student load and frequency of classes

4. For which courses did DTD provide:

   a. front-end analysis (Phase I)
   b. design products (Phase II)
   c. course development products (Phase III)
   d. instructional management plan
   e. instructor's manual
   f. student's manual
   g. POI
   h. instructional content

5. Were modifications needed in any of the products in 4 above? If yes, who made these changes? (That is, did you send them back, or do it yourself?)

6. If not provided by DTD, are the products in 4 above available? Who prepared them?

7. If DTD did not provide any of the products listed in 4 above:

   Why didn't they? Organizational problems? Time, etc.?

8. What job aids are available for the implementation of the instructional management plan?

9. What additional job aids would be useful?

IV.2 CONDUCT INSTRUCTION

Sample: From each academic department, as appropriate, one or two instructors selected on the basis of:

1. Type of instruction presented, e.g., self-packed, CBI, conventional, etc.
2. Instructional experience
3. Position within instructional team
4. Student load

QUESTIONS

1. Name
2. Course taught
3. Instructional responsibility
4. Student load
   a. per class
   b. per year
   c. How much time is there between classes for lesson changes?
5. Instructional experience—type, length of time, etc.
6. Subject-matter experience
7. Who developed your instruction?
8. How frequently are changes made in:
   a. POI
   b. Instructor's Manual
   c. Student's Manual
   d. instructional content
   e. records maintained
   f. student load
   g. lesson plans
9. Who makes the changes in the materials above?
   a. Are changes fed back to DTD?
10. How frequently does management plan change due to:
    a. unexpected increase/decrease in student loan
    b. equipment shortages
    c. environment
    d. supplies and materials
    e. availability of instructors

11. What forms are you required to submit—to whom?—copy available.

12. What job aids are available to you? (FM's)

13. What aids would be useful to you in presenting instruction?

V.1 CONDUCT INTERNAL EVALUATION

Sample: Representative From Internal Evaluation Group.

QUESTIONS

1. Name

2. Department

3. Is there an internal evaluation conducted for each course for which the signal school has propanency? If so:

   a. Who conducts it?
   b. When is it conducted—how frequently?
   c. What are the main steps of the evaluation?
   d. What guidance is available (TRADOC, local SOP, other (get copies).
   e. What standard forms are used? (Get copies)
   f. What other data is collected?
   g. How is the data summarized?
   h. How are the results used? Who are they sent to?
   i. How do the results feed into other ISD Phases?

      (1) If not used what are the reasons?

         (a) timeliness
         (b) they have their own source
         (c) format
         (d) other

4. What problems exist, especially between divisions?

5. How does ISD V.1 differ from III.5?

6. What aids would be useful?

V.2 CONDUCT EXTERNAL EVALUATION
V.3 REVISE SYSTEM

Sample: One or more individuals from Directorate of Evaluation

QUESTIONS

1. Name

2. Who determines the evaluation procedures used? TRADOC, local SOP, other.

3. If mailed questionnaires are used in the evaluation:
   a. What is the sample size?
   b. Who is sampled? e.g., graduate, supervisor, etc.
   c. How soon after graduation is individual surveyed?
   d. Are questionnaires MOS specific? If yes;
      (1) Are copies available?
      (2) What is the level of task description contained on questionnaire? If no, obtain copy of general questionnaire.
   e. How is the questionnaire administered (e.g., mailed to individual, included in 201 file, mailed to unit, etc.)?
   f. What control procedures are used to insure questionnaire return?
   g. What is the rate of return?
   h. Are there any follow-up procedures?
   i. Prior to graduation, what information is provided student concerning field feedback (i.e., answering questionnaire)?

4. For on-site evaluation visits
   a. What MOS's sampled
   b. Frequency of evaluation
   c. Sampling procedure and size
   d. Make-up of evaluation team
   e. What data is collected

5. How is evaluation data summarized? (mail, on-site)

6. How useful is the data from the mailed questionnaires?

7. Who are the results sent to? (mail and on-site)

8. How do the results feed into other ISD Phases (i.e., do they use it)? If not used, what reasons are given:
   a. Timeliness
   b. Data available from other sources
   c. Format
   d. Other

9. What role, if any, do SQTs play in the external evaluation? How are results used?

10. Of the guidance, procedures, and forms, (get copies) used by your people, which would be especially useful to others? What problems that you had in past were solved?

11. What additional guidance, or job aids, would you like to have for new people entering your directorate? Why? What problems would they solve?

APPENDIX D

BACKGROUND INFORMATION
ISD ACTIVITY CHECKLIST

Please answer each question as it pertains to your current work and/or previous experience. All responses will be CONFIDENTIAL. This information will not be reported on an individual basis to assure the privacy and anonymity of your answers.

1. Name _____ 2. Grade _____

3. Date _____

4. Division _____ 5. Branch _____

6. Bldg. # _____ 7. Telephone # _____

8. Immediate supervisor _____

9. Current job _____

10. How long have you served in this job? _____

11. Please check (√) in the chart below all the ISD activities in which you have had some experience.

- ☐ Preparing critical task listing
- ☐ Conducting field validation of critical task list
- ☐ Preparing job task performance measures
- ☐ Preparing task summary sheets/job task data cards, etc.
- ☐ Preparing list of reference materials for CM/SM
- ☐ Selecting instructional setting (where training is to be conducted)
- ☐ Writing training objectives (TLOs, LOs, CLOs, and LSs)
- ☐ Preparing test administration manual (TAM)
- ☐ Preparing SQT materials
- ☐ Preparing other tests (criterion, etc.)
- ☐ Conducting validation of tests by subject matter experts
- ☐ Conducting field validation of tests
- ☐ Making revision following validation tests
- ☐ Examining student entry behavior
- ☐ Sequencing of instructional material (course map)
- ☐ Classifying learning objectives (elements) by types of learning
- ☐ Making media methods selections
- ☐ Locating selecting, and reviewing existing materials
- ☐ Developing correspondence subcourse
- ☐ Developing TEC materials
- ☐ Developing resident lesson plan
- ☐ Developing P.E. sheets (workbooks)
- ☐ Developing self-paced performance (lesson) guide
- ☐ Developing AV scripts, T.V. scripts, etc.
- ☐ Developing programmed text, CAI, etc.
- ☐ Developing other instruction (resident/non-resident)
- ☐ Conducting developmental testing (one-on-one)
- ☐ Conducting small group validation trials
- ☐ Making revisions following small group validation trials
- ☐ Conducting large group validation trials
- ☐ Other (specify) _____

12. Please check (√) in the chart below, all the ISD activities that you have performed or will perform on a single MOS.

- ☐ Preparing critical task listing
- ☐ Conducting field validation of critical task list
- ☐ Preparing job task performance measures
- ☐ Preparing task summary sheets/job task data cards, etc.
- ☐ Preparing list of reference materials for CM/SM
- ☐ Selecting instructional setting (where training is to be conducted)
- ☐ Writing training objectives (TLOs, LOs, CLOs, and LSs)
- ☐ Preparing test administration manual (TAM)
- ☐ Preparing SQT materials
- ☐ Preparing other tests (criterion, etc.)
- ☐ Conducting validation of tests by subject matter experts
- ☐ Conducting field validation of tests
- ☐ Making revision following validation tests
- ☐ Examining student entry behavior
- ☐ Sequencing of instructional material (course map)
- ☐ Classifying learning objectives (elements) by types of learning
- ☐ Making media methods selections
- ☐ Locating selecting, and reviewing existing materials
- ☐ Developing correspondence subcourse
- ☐ Developing TEC materials
- ☐ Developing resident lesson plan
- ☐ Developing P.E. sheets (workbooks)
- ☐ Developing self-paced performance (lesson) guide
- ☐ Developing AV scripts, T.V. scripts, etc.
- ☐ Developing programmed text, CAI, etc.
- ☐ Developing other instruction (resident/non-resident)
- ☐ Conducting developmental testing (one-on-one)
- ☐ Conducting small group validation trials
- ☐ Making revisions following small group validation trials
- ☐ Conducting large group validation trials
- ☐ Other (specify) _____

ISD ACTIVITY CHECKLIST

Please answer each question as it pertains to the Instructional Systems Development (ISD) activity you have worked on during the past two weeks. This information will not be reported on an individual basis to assure the privacy and anonymity of your answers. If you have any additional comments, please enter them at the bottom of the form.

1. Name _____ 2. Date _____

3. Please check (✓) in the chart below the ISD activity that you have worked on during the past 2 weeks.

- ☐ Preparing critical task listing
- ☐ Conducting field validation of critical task list
- ☐ Preparing job task performance measures
- ☐ Preparing task summary sheets/job task data cards, etc.
- ☐ Preparing list of reference materials for CM/SM
- ☐ Selecting instructional setting (where training is to be conducted)
- ☐ Writing training objectives (TLOs, LOs, CLOs, and LSs)
- ☐ Preparing test administration manual (TAM)
- ☐ Preparing SQT materials
- ☐ Preparing other tests (criterion, etc.)
- ☐ Conducting validation of tests by subject matter experts
- ☐ Conducting field validation of tests
- ☐ Making revision following validation tests
- ☐ Examining student entry behavior
- ☐ Sequencing of instructional material (course map)
- ☐ Classifying learning objectives (elements) by types of learning
- ☐ Making media methods selections
- ☐ Locating selecting, and reviewing existing materials
- ☐ Developing correspondence subcourse
- ☐ Developing TEC materials
- ☐ Developing resident lesson plan
- ☐ Developing P.E. Sheets (workbooks)
- ☐ Developing self-paced performance (lesson) guide
- ☐ Developing AV scripts, T.V. scripts, etc.
- ☐ Developing programmed text, CAI, etc.
- ☐ Developing other instruction (resident/non-resident)
- ☐ Conducting developmental testing (one-on-one)
- ☐ Conducting small group validation trials
- ☐ Making revisions following small group validation trials
- ☐ Conducting large group validation trials
- ☐ Other (specify)

4. Did you complete (at least in draft form), the activity checked above? Yes. _____ No. _____

5. Estimate the total number of hours that you spent working on the ISD activity checked off above. _____ Hours

6. What percentage of the time that you worked on this ISD activity was spent on:

   (a) Initial Preparation _____ %

   (b) Review/Revision _____ %

   (c) Other (explain) _____ %

   _____

   _____

   _____

7. What problems (if any) did you experience in performing your work in this activity? (Please check all that are applicable.)

(a)	Guidance was not available _____	(h)	Input to my ISD work was unsatisfactory _____
(b)	Guidance was inaccurate _____	(i)	Input to my ISD work was late _____
(c)	Could not get needed information _____	(j)	Not enough time to gather information _____
(d)	Information was inaccurate _____	(k)	Not enough time to develop material _____
(e)	References were out of date _____	(l)	Not enough time to review/revise material _____
(f)	Did not receive enough supervision _____	(m)	I did not receive enough training to do this work satisfactorily _____
(g)	Not enough help from other personnel _____		

(n) Had no problems _____

Other (please describe) _____

_____

_____

_____

8. If the input to your ISD work was not satisfactory, what did you do?

(a) Reported it to my supervisor _____

(b) Returned it for revision _____

(c) Did it over myself _____

(d) Not applicable _____

(e) Other (please describe) _____

_____

_____

_____

9. Was the output (product) from your work returned to you for revision? Yes._____ No._____

If "Yes," what had to be changed? _____

(a) Errors had to be corrected _____

(b) Format was wrong _____

(c) References were wrong _____

(d) Incorrect wording _____

(e) Documentation was inadequate _____

(f) Other (please describe) _____

_____

_____

_____

COMMENTS: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Please place this form in the attached envelope and place it in the HumRRO container located in Mr. John D. Danilovich's office (Bldg. 19704) or in Mr. John R. Myers' office (Bldg. 25701).

Thank you for your cooperation.

APPENDIX E

JOB AID FOLLOW-UP INTERVIEW FORM

Interviewer _____

Date _____

BACKGROUND INFORMATION

Name _____ Grade _____

Division/CMF _____

MOS (working on) _____

Current Job _____ How long in job? _____

How long in ISD block for which Job Aid designed? _____

Any formal training in this ISD block? If yes, what and how much? _____

_____

Did you complete a Background Information Sheet a few months ago? _____ If no, have them complete a Base-line Data Background Information Sheet.

Who is your supervisor? _____

FLOWCHART

1. To what extent did you actually use the Flowcharts?

2. Were the symbols used understandable?

3. Was written material on side understandable and useful?

FLOWCHART (Continued)

4. Were there times when you were referred to the manual unnecessarily? Times when you should have been referred and were not? Which blocks?

5. Did you ever go to the Manual to see an example when not required to do so? If yes, how frequently?

6. Was there a need for expansion/collapse of some flowchart blocks? If yes, where?

7. Were there too few/too many supervisor checks of your work called for in the aid? Where should they have been added or deleted?

8. What is your overall evaluation of the flowcharts? How can they be improved?

INTRODUCTION TO JOB AIDS

9. How good a job did it do in explaining what the Job Aids were? How can it be improved?

RESOURCE MANUAL

10. Did you use the Resource Manual? How well did it cover: CODAP, School Conducted Field Surveys, and School convened panels?

MANUAL

11. Were the partial flowcharts at the top of the page useful? To what extent did you use them?

12. Was the overview to the job aid useful to you? How can it be improved?

13. Were the questions used to introduce each area useful?

14. Is the text in the manual too difficult to read? Explain.

15. Were there inaccuracies in the information presente ? Explain.

MANUAL (Continued)

16. Were important sources of information omitted? If yes, what are these sources?

17. Was inappropriate or obsolete information presented? Explain.

18. How useful were the references provided? Were they correct? What additional references or sources of information do you usually use?

19. How useful are the examples provided?

20. What is your overall evaluation of the Manual? How can it be improved?

WORKSHEETS

21. How useful were the Worksheets provided? How can they be improved?

WORKSHEETS (Continued)

22. Did the Worksheets require too little/too much documentation?

GENERAL

23. Was the reading level of the Job Aid (flowcharts, introduction, etc.) too high/too low?

24. What did you do before you had this Job Aid that was better or more efficient for performing the work in this area?

25. Do you think that by using this Job Aid you have turned out a better quality product than without the aid?

26. In the long run, do you think that use of the Job Aid will turn out products faster or slower than without the aid?

27. Do you think the Job Aid is too long/too short or about right in length?

GENERAL (Continued)

28. Will you continue to use this aid in the future? If no, find out why.

29. What type of person do you think would find this aid useful? (i.e., inexperienced/ experienced)

30. In order to use the Job Aid you needed materials from individuals who had performed ISD activities preceding yours. Did the materials used hinder or help you in <u>your</u> work?

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